MR98 Series

Introduction

This Installation Guide provides instructions for installation, startup and adjustment. To receive a copy of the instruction manual, contact your local Sales Office or view a copy at www.fisherregulators.com. For further information refer to MR98 Series Backpressure Regulators, Relief and Differential Relief valves Instruction Manual, D103588X012.

P.E.D. Category

This product may be used as a safety accessory with pressure equipment in the following Pressure Equipment Directive 97/23/EC categories. It may also be used outside of the Pressure Equipment Directive using Sound Engineering Practice (SEP) per table below.

TYPE	PRODUCT SIZE	BODY MATERIAL	CATEGORY
All	1/4 NPT, DN 15 to 25 / 1/2 to 1-inch	All available materials	SEP
MR98H/ MR98HD	DN 40 and 50 / 1-1/2 and 2-inch	Steel and Stainless Steel	II

Specifications

Available Constructions

Type MR98L: Direct-operated low pressure backpressure regulator/relief valve with 0.14 to 2.6 bar / 2 to 38 psig set pressure range

Type MR98H: Direct-operated high pressure backpressure regulator/relief valve with 0.34 to 13.8 bar / 5 to 200 psig set pressure range

Type MR98HH: Direct-operated high pressure backpressure/ relief valve with 10.3 to 25.9 bar / 150 to 375 psig set pressure range

Type MR98LD: Pressure-loaded low pressure differential pressure relief valve with 0.14 to 2.6 bar / 2 to 38 psi set pressure range

Type MR98HD: Pressure-loaded high pressure differential pressure relief valve with 0.34 to 13.8 bar / 5 to 200 psi set pressure range

Type MR98HHD: Pressure-operated high pressure backpressure/relief valve with 10.3 to 25.9 bar / 150 to 375 psi differential set pressure range

Body and Orifice Sizes

1/4 NPT body: 7.22 mm / 0.284-inch orifice
DN 15 / 1/2-inch body: 10.56 mm / 0.416-inch orifice
DN 20 and 25 / 3/4 and 1-inch bodies:
16.02 mm / 0.631-inch orifice
DN 40 and 50 / 1-1/2 and 2-inch bodies:
29 mm / 1.142-inch orifice

End Connection Styles

NPT, SWE and Welded and Integral CL150 RF, CL300 RF and PN 16/25/40 RF; all sizes are fabricated with slip-on flanges (for welded end connections) and are EN flanged 356-mm face-to-face (14-inch face-to-face)

Maximum Inlet and Outlet Pressure Rating

See Table 2

Maximum Cold Working Pressures of Body Size and Materials(1)(2)

See Table 2

Set Pressure Ranges(1)

See Table 1

Maximum Spring Case Loading Pressure for Types MR98LD, MR98HD and MR98HHD (Spring Setting Plus Loading Pressure)(1)(2)

Type MR98LD Spring Case
Gray Cast Iron: 3.4 bar / 50 psig
Steel or Stainless Steel: 8.6 bar / 125 psig
Type MR98HD Spring Case
Gray Cast Iron: 17.2 bar / 250 psig
Steel or Stainless Steel: 20.7 bar / 300 psig
Type MR98HHD Spring Case
Steel or Stainless Steel: 20.7 bar / 300 psig

Temperature Capabilities(1)

Elastomer Parts:
Nitrile (NBR) and Neoprene (CR): -40 to 82°C / -40 to 180°F
Fluorocarbon (FKM)(3): -18 to 149°C / 0 to 300°F
Ethylenepropylene (EPDM): -7 to 135°C / 20 to 275°F
Perfluoroelastomer (FFKM): -18 to 218°C / 0 to 425°F
Polytetrafluoroethylene (PTFE) Diaphragm protector: -40 to 204°C / -40 to 400°F

Body Materials:
Gray Cast Iron: -29 to 208°C / -20 to 406°F
WCC Steel: -29 to 232°C / -20 to 450°F
LCC Steel: -40 to 232°C / -40 to 450°F
Stainless Steel, Monel® and Hastelloy® C: -40 to 232°C / -40 to 450°F

Pressure Registration

Internal or External

Shutoff Classification Per ANSI/FCI 70-3-2004

Metal Seats: Class IV
PTFE: Class IV
Elastomer Seats: Class VI or better

Installation

WARNING

Only qualified personnel shall install or service a relief valve or backpressure regulator. Relief valve or backpressure regulator should be installed, operated and maintained in accordance with international and applicable codes and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If using a relief valve or backpressure regulator on a hazardous or flammable fluid service, personal injury and property damage could occur due to fire or explosion of vented fluid that may have accumulated. To prevent such injury or damage, provide piping or tubing to vent the fluid to a safe, well-ventilated area or containment vessel. Also, when venting a hazardous fluid, the piping or tubing should be located far enough away from any buildings or windows so to not create a further hazard and the vent opening should be protected against anything that could clog it.

Personal injury, equipment damage or leakage due to escaping fluid or bursting of pressure-containing parts may result if this relief valve or backpressure regulator is overpressured or is installed where service conditions could exceed

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1. The pressure/temperature limits in this Installation Guide and any applicable standard or code limitation should not be exceeded.
2. The pressure limits given are based on the body size and body materials only. Actual pressure limits of the assembled regulator may decrease and vary depending on the temperature, body end connection, diaphragm, seat and/or trim material of the regulator.
3. Fluorocarbon (FKM) is limited to 93°C / 200°F hot water.

D103588X014

Table 1. *MR98 Series Body Sizes and Pressure Ranges*

TYPE	BODY SIZE		CONTROL PRESSURE RANGE(1)	
	DN	Inch	bar	psig
MR98L and MR98LD	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	0.14 to 0.48	2 to 7
			0.41 to 0.97	6 to 14
			0.83 to 1.7	12 to 25
			1.4 to 2.6	20 to 38
MR98H and MR98HD	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	1.0 to 2.4	15 to 35
			1.7 to 5.2	25 to 75
			4.8 to 9.7	70 to 140
			9.0 to 13.8	130 to 200
	40 and 50	1-1/2 and 2	0.34 to 2.4	5 to 35
			1.4 to 4.5	20 to 65
			3.4 to 6.9	50 to 100
			5.2 to 11.7	75 to 170
MR98HH and MR98HHD	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	10.3 to 25.9	150 to 375

1. All springs may be backed off to 0 bar / 0 psig. However, highest capacities and best performances are obtained by using these springs in their recommended ranges.

Table 2. *Maximum Cold Working Pressures of Body Size and Materials(1)(2)*

REGULATOR TYPE	BODY SIZE	BODY AND SPRING CASE MATERIALS	MAXIMUM INLET PRESSURE(3)		MAXIMUM OUTLET PRESSURE		MAXIMUM SPRING CASE PRESSURE	
			bar	psig	bar	psig	bar	psig
MR98L/ MR98LD	All Sizes	Gray Cast Iron	4.14	60	4.14	60	3.44	50
		Steel; Stainless Steel; Monel®; Hastelloy® C	10.3	150	10.3	150	8.61	125
MR98H/ MR98HD	All Sizes	Gray Cast Iron	20.7	300	20.7	300	17.2	250
		Steel; Stainless Steel; Monel®; Hastelloy® C; Aluminum-Bronze	20.7	300	20.7	300	20.7	300
MR98HH/ MR98HHD	All Sizes	All available materials	27.6	400	27.6	400	20.7	300

1. The pressure/temperature limits in this Installation Guide and any applicable standard limitation should not be exceeded.
2. Temperature, trim material and/or the body end connection may decrease these maximum pressures.
3. Maximum inlet pressure equals set pressure plus build-up.

the limits given in the Specifications section or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the relief valve or backpressure regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the relief valve or backpressure regulator in a safe location.

Clean out all pipelines before installation of the relief valve or backpressure regulator and check to be sure the relief valve or backpressure regulator has not been damaged or has collected foreign material during shipping. For NPT bodies, apply pipe compound to the external pipe threads. For flanged bodies, use suitable line gaskets and approved piping and bolting practices. Install the relief valve or backpressure regulator in any position desired, unless otherwise specified, but be sure flow through the body is in the direction indicated by the arrow on the body.

Note

It is important that the relief valve or backpressure regulator be installed so that the vent hole in the spring case is unobstructed at all times. For outdoor installations, the relief valve or backpressure regulator should be located away from vehicular traffic and positioned so that water, ice and other foreign materials cannot enter the spring case through the vent. Avoid placing the relief valve or backpressure regulator beneath eaves or downspouts and be sure it is above the probable snow level.

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Overpressure Protection

Maximum inlet pressure depend upon body materials and temperatures. See Specifications section or the maximum inlet pressure of the valve and the maximum spring case loading pressures stamped on the nameplate of Types MR98LD, MR98HD and MR98HHD. The valve should be inspected for damage after any overpressure condition. **Fisher® relief valve or backpressure regulators are NOT ASME safety relief valves.**

Startup

The relief valve or backpressure regulator is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to give the desired results. With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream shutoff valves (if applicable).

Adjustment

To change the control pressure, remove closing cap or loosen the jam nut and turn the adjusting screw clockwise to increase control pressure or counterclockwise to decrease pressure. Monitor the control pressure with a test gauge during the adjustment. Replace closing cap or tighten the jam nut to maintain the desired setting.

Taking Out of Service (Shutdown)

WARNING

To avoid personal injury resulting from sudden release of pressure, isolate the relief valve or backpressure regulator from all pressure before attempting disassembly.

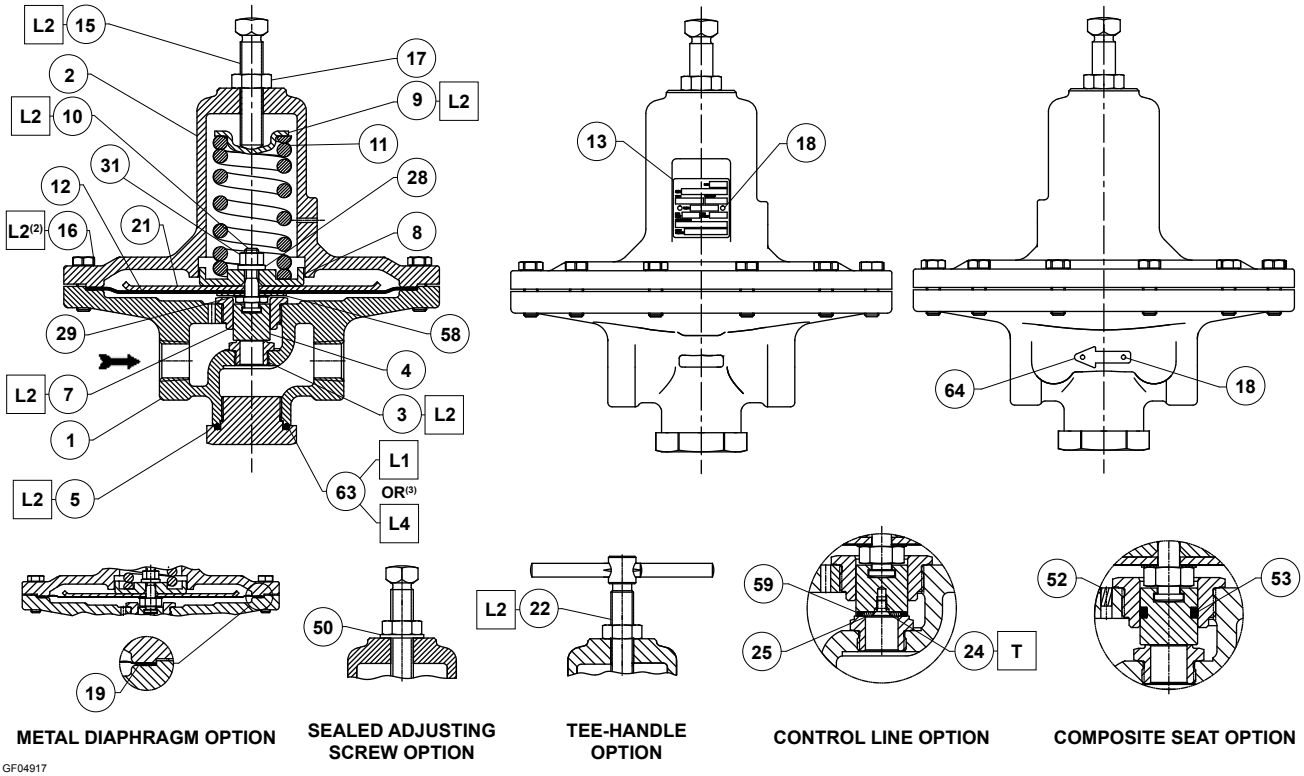
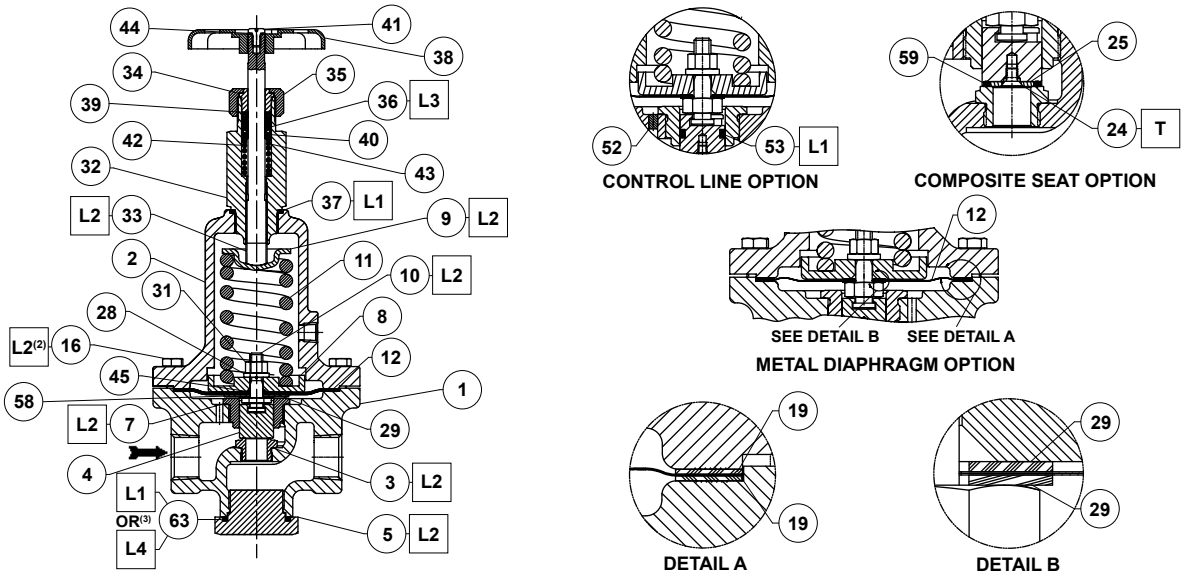


Figure 1. *Type MR98L Assembly*

Parts List

Key	Description
1	Body
2	Spring Case
3*	Orifice
4*	Valve Plug
5	Bottom Plug
7	Valve Plug Guide
8	Lower Spring Seat
9	Upper Spring Seat
10	Pusher Post
11	Control Spring
12*	Diaphragm (2 required for metal, FKM and EPDM diaphragms)(4)
13	Nameplate
14	Diaphragm Protector (not shown)
15	Adjusting Screw
16	Cap Screws Types MR98L and MR98LD 1/4 NPT; DN 15 / 1/2-inch bodies - 10 required DN 20 and 25 / 3/4 and 1-inch bodies - 12 required Types MR98H, MR98HD, MR98HH and MR98HHD 1/4 NPT body - 6 required DN 15 to 50 / 1/2 to 2-inch bodies - 8 required
17	Jam Nut
18	Drive Screw (4 required)
19*	Diaphragm Gasket (2 required for pressure loaded spring case)
21	Diaphragm Head
22	Adjusting Screw Assembly
23	Handwheel (not shown)
24	Machine Screw
25	O-ring Retainer
25	Seat Retainer
28	Lockwasher
29*	Gasket
31	Locknut
32	Stuffing Box
33	Adjusting Screw
34	Packing Follower
35	Stuffing Box Nut
36	Packing V-Ring (3 required)
37*	Stuff Box Gasket
38	Handwheel / Handle
39	Internal Adaptor
40	External Adaptor
41	Machine Screw
41	Jam Nut
42	Spring
43	Washer
44	Washer
45*	O-ring
47	NACE Tag (not shown)
48	Tag Wire (not shown)
49	Lockwasher (not shown)
50*	Sealing Washer
51	Vent (not shown)
52	Plug
53*	Valve Plug O-ring
57	Jam Nut (not shown)
58	Washer
59*	O-ring
59*	L-ring
62	Adaptor (not shown)
63*	Bottom Plug Seal
64	Flow Arrow
65	Pipe Plug (not shown)
66	Pressure Gauge (not shown)
68	Restriction (not shown)
69	ATEX Tag (not shown)
70	PED Tag (not shown)

*Recommended Spare Part
1. Lubricants and sealants must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for Stainless Steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.
4. Only one metal diaphragm is needed for Types MR98L and MR98LD with 1/4 NPT body size and 0.14 to 0.48 bar / 2 to 7 psi spring range.



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☐ **APPLY(1):**
T = THREAD LOCKER
L1 = GENERAL PURPOSE PTFE OR LITHIUM GREASE FOR O-RINGS
L2 = ANTI-SEIZE COMPOUND
L3 = SILICONE GREASE
L4 = GRAPHITE SEALANT FOR GRAPHITE RING
1. Lubricants and sealants must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for Stainless Steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

Figure 2. *Type MR98HD Assembly with 1/4 NPT, DN 15 to 25 / 1/2 to 1-inch Bodies*

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The distinctive diamond shape cast into every spring case uniquely identifies the regulator as part of the Fisher® brand and assures you of the highest-quality engineering, durability, performance, and support.

For further information visit www.fisherregulators.com